UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KENNETH NODDINGS, DANIEL MARSHALL ANDREWS, MICHAEL ANTHONY OLLA, and THOMAS ALAN BISHOP

Appeal 2007-3826
Application 09/954,717
Technology Center 1700

Decided: November 20, 2007

Before BRADLEY R. GARRIS, CHARLES F. WARREN, and MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

1Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 1, 2, 4-13, 19-23, 38, and 45-70. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

INTRODUCTION

Appellants disclose a method of forming optical devices and assemblies (Specification ¶ [1000]). Appellants' claimed method generally

includes positioning a first component and a second component in a mold and applying formable material between the first and second components to form a waveguide between the first and second components (claim 1). One of the components placed in the mold may be an active optical component, which includes a laser, a light emitting diode and a light detector (Specification 5).

Claims 1, 19, 20, 21, 22, 38, 45, 48, 56, and 66 are illustrative:

> 1. A method of forming an assembly of optical components, comprising;
>
> providing a mold;
>
> positioning a first component in the mold;
>
> positioning a second component in the mold; and
>
> applying a formable material into the mold to form a waveguide for carrying light between the first and second components, the waveguide forming an optical path between the first component and the second component, at least one of the first or second components including a laser or other active optical component.
>
> 19. A method of forming a light-carrying optical waveguide assembly, comprising:
>
> providing a tool having a pattern to be transferred to a light-carrying optical waveguide, the tool aligning an optical component relative to the waveguide pattern;
>
> forming the optical waveguide aligned with the optical component by shaping a formable material using the tool;
>
> hardening the formable material to produce a waveguide aligned with the component; and

after the formable material is hardened, applying a formable cladding material over the optical waveguide.

20. A method of forming an optical waveguide assembly [*sic*],

providing a tool having a pattern to be transferred to a light-carrying optical waveguide, the tool aligning an optical component relative to the waveguide pattern;

forming the optical waveguide aligned with the optical component by shaping a formable material using the tool; and hardening the formable material to produce a waveguide aligned with the component; and

removing the optical waveguide from the tool by adhering the optical waveguide to a support structure.

21. The method of claim 20 in which adhering the optical waveguide to a support structure includes molding a support structure onto the optical waveguide.

22. The method of claim 20 in which adhering the optical waveguide to a support structure includes contacting a prefabricated molded support structure onto the optical waveguide

38. A method of terminating an optical fiber, comprising:

inserting the optical fiber into a mold; and

inserting into the mold a formable light-carrying material, the light-carrying material contacting the optical fiber and forming a light path to or from the optical fiber, the light path including two ends, a proximal end carrying light to or from the optical fiber and a distal end formed into a connecting structure having an optical axis and a connecting surface through which light is carried to a connecting component, the connecting surface being oriented at an angle of between 0 degrees and 55 degrees from a normal to the optical axis.

45. A method of forming a light-carrying waveguide, comprising:

providing a precision mold having there in a cavity corresponding to the desired shape of the waveguide;

inserting a formable material into the cavity of the precision mold, the formable material taking on at least in part the shape of the cavity to form the waveguide;

hardening the waveguide; and

removing the waveguide from the precision mold.

48. The method of claim 47 in which molding a support structure onto the waveguide includes molding a cladding material onto the waveguide.

56. A method of forming an assembly of optical components, comprising:

positioning a first component in a mold;

positioning a second component in the mold; and

applying a formable material into the mold to form a light-carrying waveguide between the first and second components, the waveguide forming an optical path between the first component and the second component,

removing the first component, the second component, and the waveguide from a mold used to form the waveguide by providing a support structure to support the first component, the second component, and the waveguide as it is removed.

66. A method of making an optical assembly, comprising:

providing a precision mold having an alignment structure within the mold for aligning at least one active optical element and having a structure for forming a light-carrying waveguide to the at least one optical element;

positioning the at least one active optical component within the precision mold using the alignment structure;

filling the structure for molding a light-carrying waveguide to the at least one optical element with a waveguide forming material; and

removing the precision [*sic*] at least one optical element and the light-carrying waveguide from the precision mold, the alignment structure providing sufficiently accurate alignment to eliminate the requirement for active alignment.

The Examiner relies on the following prior art references as evidence of unpatentability:

Daniel	US 4,466,697	Aug. 21, 1984
Malavieille	US 4,662,962	May 5, 1987
Eide	US 5,031,984	Jul. 16, 1991
Lebby	US 5,389,312	Feb. 14, 1995
Bischel	US 6,208,791 B1	Mar. 27, 2001

The rejections as presented by the Examiner are as follows:

1. Claim 19 is rejected under 35 U.S.C. § 102(b) as being unpatentable over Eide.
2. Claims 20-23, 38, 45-51, 56-61 and 66 are rejected under 35 U.S.C. § 102(b) as being unpatentable over Malavieille.
3. Claims 1, 2, 55 [*sic* 54] and 55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Eide in view of Malavieille.[1]

[1] Appellants indicate that they understand the Examiner's § 103 rejection over Eide in view of Malavieille to include claims 1, 2, 54, and 55 (Br. 9).

4. Claims 4-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Eide in view of Malavieille and Daniel.
5. Claims 52-54 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Eide in view of Malavieille and Lebby.
6. Claims 62-70 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Malavieille in view of Bischel.

Appellants separately argue independent claims 1, 19, 20, 38, 45, 56, and 66 and dependent claims 10, 11, 21, 22, 47, 48, 50, 58, 59, 61, and 63. In our decision of this appeal the following disposition of claims applies: (1) Dependent claims 2, 4-13, and 52-55, which directly or ultimately depend from independent claim 1, stand or fall with independent claim 1; (2) Dependent claim 23, which depends upon claim 20, stands or falls with claim 20; (3) Dependent claims 46, 49, and 51, which directly or ultimately depend on claim 45, stand or fall with claim 45; (4) Dependent claims 57, 60, and 62, which depend on claim 56, stand of fall with claim 56; (5) Dependent claims 64 and 65, which depend on claim 61, stand or fall with claim 61; and (6) Dependent claims 67-70, which directly or ultimately depend on claim 66, stand or fall with claim 66.

OPINION

35 U.S.C. § 102(b) REJECTION OVER EIDE: CLAIM 19

Appellants argue that Eide does not teach forming a waveguide by shaping a formable material (Br. 12). Appellants further argue that Eide's index matching adhesive 20 does not function as a waveguide because it does not "'confine and direct electromagnetic waves in a direction determined by its physical boundaries'" (Br. 14). Appellants argue that Eide

does not disclose applying a formable cladding material over the optical waveguide as recited in claim 19 (Br. 15). Appellants argue that Eide's plastic cover and sealant material are not included in the claim term "cladding" (Br. 15). Appellants contend that "cladding" is limited to material that has an index of refraction slightly less than that of the core to assist in guiding the light (Br. 15).

We have considered all of Appellants' arguments and are unpersuaded for the reasons below.

As an initial matter we must construe the claim terms "waveguide" and "cladding." During examination, claim terms are given their broadest reasonable interpretation consistent with the Specification. *In re American Academy of Science Tech Center*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

In the present case, Appellants have not provided a definition of "waveguide" in the Specification. However, Appellants disclose that the waveguide is formed of a material that has an index of refraction matched to the fiber core or other mating component (Specification ¶ [1048]). Appellants also provide definitions from various sources in the Brief (Br. 13), that define "waveguide" generally as a device that guides or confines and directs electromagnetic waves along its length (Br. 13). Accordingly, we construe "waveguide" as a device composed of material that has an index of refraction matched to a fiber core or other mating components for guiding or confining and directing electromagnetic waves along its length.

Appellants have not defined "cladding" in the Specification. However, Appellants disclose that "cladding forming material *preferabl[y]* . . . has an index of refraction less than that of the waveguide forming material" (emphasis added) (Specification ¶ [1055]). Appellants disclose

that "the surrounding air" may be the cladding and that the "cladding material can be used as a protective layer for the assembly or as a structural component" (Specification ¶ [1076]). Appellants further disclose that cladding may be formed around only a portion of the waveguide (Specification ¶ [1073]). In accordance with Appellants' disclosures above, we construe "cladding" as any material that is at least partially formed around the waveguide core; the material may have a index of refraction less than that of the waveguide forming material and it may serve as a protective layer.

Applying our construction of the claim terms "waveguide" and "cladding" to Eide's disclosure, we agree with the Examiner that Eide discloses the argued claim features. Regarding the argued "waveguide" feature, Eide discloses an optical fiber coupler that surrounds a junction of link fiber 12 and two branch fibers 14, 16 with an adhesive 20 (Eide, col. 3, ll. 55-61). Eide further discloses that adhesive 20 has index-matching characteristics with the fibers, which is advantageous when coupling optical fibers (Eide, col. 3, ll. 61-63). Eide discloses that "when the fibers are joined at junction **18**, the cores of all three fibers are all in contact with each other" (Eide, col. 4, ll. 8-10). Eide discloses "minimiz[ing]" fiber spacing at the junction 18 (Eide, col. 4, ll. 27-28), and that the fiber ends should be as close together as possible (Eide, col. 6, ll. 13-15).

Though Eide discloses that the fiber cores are in contact when joined at junction 18, Eide further discloses to minimize the spacing between the fibers at the junction 18. Eide's disclosure to minimize the spacing between the fiber ends at junction 18 does not exclude having some spacing between the fiber ends. Furthermore, Eide's use of refractive index-matching

medium supports a finding that there must be a space between the fibers that is filled by the adhesive; otherwise there would be no need for the adhesive to have refractive index-matching characteristics. In other words, Eide's disclosure that the fiber cores are in contact at junction 18 includes the fiber cores being in contact via the adhesive 20 deposited between the minimally spaced fiber ends. From the foregoing, it is clear from Eide's disclosure that some spacing is present between the ends of the fibers.

The index-matching adhesive encapsulating the fibers and filling the space between the fiber ends would necessarily have to guide or constrain and direct the light between the fibers (i.e., a waveguide as construed above) or else the junction would not function as a coupler. In light of Eide's disclosure and our construction of "waveguide," we agree with the Examiner that Eide's adhesive 20 between the fiber ends satisfies Appellants' claimed "waveguide."

Regarding the argued "cladding" claim feature, Eide further discloses that the glass plate 10 which holds the fiber junction 18, including the optical fibers with fiber cores, is encapsulated by a cover 44 that cooperates with body 40 to seal (i.e., protect) the interior of the module (Eide, col. 4, ll. 36-63). Eide's sealant 43 also surrounds the fiber core and protects the fiber (Eide, col. 4, ll. 58-60). Therefore, in light of our construction of "cladding," cover 44, body 40 and sealant 43 satisfy Appellants' claimed "cladding."

For the above reasons, we are unpersuaded that Eide fails to disclose Appellants' argued claim features. Accordingly, we affirm the Examiner's § 102(b) rejection of claim 19 over Eide.

35 U.S.C. § 102(b) REJECTION OVER MALAVIEILLE

INDEPENDENT CLAIMS 20, 38, 45, AND 56

Appellants argue that Malavieille does not teach forming a waveguide or that the index matching medium 59 functions as a waveguide (i.e., directing and containing radiation) (Br. 15, 16, 17). Regarding claim 38, Appellants further argue that Malavieille does not disclose "a distal end formed into a connecting structure" (Br. 16).

We have considered all of Appellants' arguments and are unpersuaded for the reasons below.

Malavieille discloses connecting optical fibers by placing a refractive index matching settable liquid (e.g., index matching medium 59) in the groove of support block 4 (i.e., mold), positioning the optical fibers (11 and 12) in the groove of the support block 4 (i.e., mold) such that the ends of the optical fibers are immersed in the index matching settable liquid, pressing a glass plate 8 atop the groove of the support block 4 (i.e., mold), curing the settable liquid, and removing the glass plate 8 to produce a supported optical fiber connection (Malavieille, col. 4, ll. 9-68; col. 5, ll. 1-13). Malavieille discloses it is advantageous to leave a gap between the optical fiber ends and filling the gap with refractive index matching medium 59 (Malavieille, col. 7, ll. 4-16 and 60-64). Malavieille further discloses that the settable liquid (i.e., index matching medium) has "refractive index close to that of the silica of the glass fibers [to] improve [] . . . transmission of light between the two fibers by attenuating index jumps in the separation diopters" (Malavieille, col. 4, ll. 40-44).

From Malavieille's disclosures noted above, it is evident that Malavieille's index matching medium 59 functions as a "waveguide," as we

have construed the term above, in connecting the two optical fibers. Moreover, Malavieille's disclosure that the index matching medium "improves the transmission of light *between* the two fibers" (emphasis added) (Malavieille, col. 4, ll. 40-44) further indicates that the index matching medium 59 forms a structure that guides or directs and confines light between the fibers (i.e., a "waveguide" as construed by the Board above). Therefore, we determine that the Examiner has reasonably found that Malavieille discloses forming a waveguide between the optical fibers.

Regarding Appellants' argument that Malavieille does not disclose forming a connection structure as recited in claim 38, we determine that the process of forming the waveguide between the two optical fibers would necessarily form a waveguide having a proximal end and a distal end formed into a connecting structure. Specifically, the proximal portion of the waveguide carries light to or from one of the optical fibers and a distal end of the waveguide is formed into a connecting structure to receive the second optical fiber. Accordingly, we are unpersuaded by Appellants' argument regarding claim 38.

DEPENDENT CLAIMS 21, 22, 47, AND 58

Appellants argue that Malavieille does not disclose molding a support structure onto the waveguide (Br. 16 and 17). Appellants contend that Malavieille's glass plate 8 is preformed and, thus, is not molded onto a waveguide (Br. 16). Appellants further contend Malavieille's protective resin 80 is not a support as indicated by the Examiner (Br. 16). Regarding claim 22, Appellants argue that Malavieille's support is glass plate 8 which

is not a "prefabricated molded support structure" as recited in claim 22 (Br. 16).

We have considered all of Appellants' arguments and are unpersuaded for the reasons below.

Malavieille discloses connecting optical fibers by placing a refractive index matching settable liquid (e.g., index matching medium 59) in the groove of support block 4 (i.e., mold), positioning the optical fibers (11 and 12) in the groove of the support block 4 (i.e., mold) such that the ends of the optical fibers are immersed in the index matching settable liquid, pressing a glass plate 8 atop the groove of the support block 4 (i.e., mold), curing the settable liquid, and removing the glass plate 8 to produce a supported optical fiber connection (Malavieille, col. 4, ll. 9-68; col. 5, ll. 1-13). The supported optical fiber connection includes glass plate 8 and a "spine" of glue (i.e., index matching medium 59) as best shown by Malavieille's Figure 9 (Malavieille, col. 5, ll. 7-13). Malavieille also discloses that additional glass plates 8 may be attached to (i.e., molded on) the optical fiber connection using a resin 80 (Malavieille, col. 6, ll. 4-10, Figure 11).

Regarding Appellants' arguments directed to Malavieille's glass plate(s) 8 and resin 80, Malavieille's disclosures noted above clearly indicate that glass plate(s) 8 is/are attached to (i.e., molded onto) the waveguide using index matching medium 59 or resin 80, respectively. Both glass plate(s) 8 and resin 80 support the optical waveguide formed by index matching medium 59. Stated differently, claims 21, 22, 47, and 58 do not exclude Malavieille's preformed glass plate(s) 8, which is/are attached to (i.e., molded onto) the waveguide by molding the index matching medium

59 or resin 80. Therefore, Malavieille discloses the argued features of claims 21, 22, 47, and 58.

Regarding Appellants' additional argument directed to claim 22, the claim recitation "prefabricated molded" does not limit the method step of contacting the support structure. In other words, the claim language "prefabricated molded" does not affect the method step of contacting a support structure onto the optical waveguide and, so, cannot serve to distinguish the method claim from the prior art. In any event, we find that Malavieille's glass plate must be formed by molding (e.g., float glass technique, extrusion, or roll formed). Thus, Appellants' argument directed to claim 22 is unpersuasive.

DEPENDENT CLAIMS 48 AND 59

Appellants argue that Malavieille does not disclose molding a cladding material (Br. 17). Appellants contend that "cladding" is a material that has an index of refraction slightly less than that of the core to assist in guiding the light, and that Malavieille does not disclose that resin 80 has such a property (Br. 17).

We have considered Appellants' arguments and are unpersuaded for the reasons below.

In our above discussion of the § 102(b) rejection over Eide, we construed the claim term "cladding" as any material at least partially formed around the waveguide core; the material may have a index of refraction less than that of the waveguide forming material and it may serve as a protective layer. We apply our construction of "cladding" to Malavieille's resin 80.

Malavieille discloses that resin 80 is used to protect the optical fiber splice by covering (i.e., at least partially formed around) the entire splice (i.e., the optical fibers including the fiber core) (Malavieille, col. 5, ll. 67-68; col. 6, ll. 1-2; Figure 10). As such, we determine that Appellants' claim term "cladding" includes Malavieille's resin 80.

Accordingly, we agree with the Examiner that Malavieille discloses "cladding" material a recited in claims 48 and 59.

DEPENDENT CLAIM 61 AND INDEPENDENT CLAIM 66

Claim 61 recites, in relevant part, "positioning a second component in the mold includes aligning an active optical element using an alignment structure" and "the light carrying waveguide [*sic*] guide being sufficiently aligned with the active optical element to eliminate the need for active alignment."

Claim 66 recites, in relevant part, "positioning the at least one active optical component within the precision mold using the alignment structure" and "the alignment structure providing sufficiently accurate alignment to eliminate the requirement for active alignment."

Appellants argue that Malavieille discloses splicing optical fibers, not aligning an active component (Br. 17). Appellants further argue that Malavieille discloses active alignment of the fibers using a microscope (Br. 17).

We cannot sustain the Examiner's § 102(b) rejection of claims 61 and 66 over Malavieille.

Appellants disclose that "[a]ctive devices include, for example, light emitting diodes and lasers . . . and detectors" (Specification ¶ [1007]).

Appellants further disclose that "[p]assive devices include, for example, optical fibers that carry light and couplers that route light between fibers" (Specification ¶ [1007]). Appellants define "actively align" as transmitting "light . . . through the device and the connection is monitored during the alignment process" (Specification ¶ [1010]). We apply the Appellants' definition of "actively align," and their descriptions of "active device" and "passive device" to Malavieille's disclosure.

Malavieille discloses a method for connecting two optical fibers (i.e., passive devices) (Malavieille, col. 1, ll. 39-41). Malavieille further discloses using a microscope to verify that the fibers are properly aligned in the support block 4 (i.e., mold) by transmitting light through the fiber and monitoring the light transmission (i.e., active alignment) (Malavieille, col. 6, ll. 15-23).

The above-noted disclosures indicate that, contrary to the features of Appellants' claims 61 and 66, Malavieille discloses coupling passive devices (i.e., optical fibers) and actively aligning the passive devices using a microscope. Accordingly, Malavieille does not disclose the subject matter of Appellants' claims 61 and 66.

For the above reasons, the Examiner's rejection of claims 20-23, 38, 45-51, 56-61, and 66 under § 102(b) over Malavieille receives the following disposition: (1) with regard to claims 20-23, 38, 45-51, and 56-60, we affirm the § 102(b) rejection over Malavieille, and (2) with regard to claims 61 and 66, we reverse the Examiner's § 102(b) rejection over Malavieille.

35 U.S.C. § 103(a) REJECTION OVER EIDE IN VIEW OF MALAVIEILLE

Appellants' argue that Eide and Malavieille splice optical fibers (i.e., passive devices) and do not disclose forming a waveguide to an active component as recited in claim 1 (Br. 18). We agree.

As noted above in our discussion of Malavieille, Appellants disclose that "[a]ctive devices include, for example, light emitting diodes and lasers . . . and detectors" (Specification ¶ [1007]). Appellants further disclose that "[p]assive devices include, for example, optical fibers that carry light and couplers that route light between fibers" (Specification ¶ [1007]).

Applying Appellants' description of "passive devices" and "active devices" to Eide's and Malavieille's disclosures, we find that both disclose connecting passive devices. Specifically, Malavieille discloses a method for connecting two optical fibers (i.e., passive devices) using an index-matching adhesive (Malavieille, col. 1, ll. 39-41; col. 4, ll. 39-44). Eide discloses a passive coupler device for connecting optical fibers (Eide, col. 2, ll. 50-55). As the Examiner found (Ans. 5), Eide discloses that the passive coupler device includes a glass substrate with fibers connected together by an index-matching adhesive (i.e., the waveguide formed between the fibers) (Eide, col. 4, ll. 11-33). As is clearly disclosed by Eide and Malavieille, the waveguide is formed between two optical fibers (i.e., passive devices).

The Examiner's position is that one of Eide's or Malavieille's optical fibers in the coupler would be considered active because the fiber is attached to a laser or light emitting device (i.e., an active device) (Answer 14). However, such a position is not reasonable in light of Appellants' clear claim language that states that an active optical component (e.g., second

component) and another component (e.g., first component) are positioned within a mold and a waveguide is formed between the first and second components (claim 1).

Moreover, Appellants' Specification describes the waveguide being formed between a passive device (i.e., optical fiber) and an active device (i.e., VCSEL laser) (Specification ¶¶ [1084]-[1092]). Appellants specifically describe placing a VCSEL laser into the mold and molding a waveguide over the emission point of the laser to guide light to a fiber 1214 (Specification ¶ [1084]).

In light of the Appellants' clear claim language and their disclosure to position the active device in the mold, we construe claim 1 as requiring "a laser or other active optical component," not merely a passive portion (i.e., an optical fiber) of the active device, be positioned in the mold.

For the above reasons, we reverse the Examiner's § 103(a) rejection of claims 1, 2, 55 [*sic* 54], and 55 over Eide in view of Malavieille.

35 U.S.C. § 103(a) REJECTIONS: CLAIMS 4-13 OVER EIDE IN VIEW OF MALAVIEILLE AND DANIEL, AND CLAIMS 52-54 OVER EIDE IN VIEW OF MALAVIEILLE AND LEBBY

Claims 4-13 and 52-54 all depend from claim 1. Because we reverse the § 103(a) rejection of independent claim 1 over Eide in view Malavieille, the § 103(a) rejections of dependent claims 4-13 and 52-54 based on the combination of Eide in view of Malavieille and Daniel or Lebby respectively must likewise be reversed for the same reasons as the rejection of claim 1.

Accordingly, we reverse the § 103(a) rejection of claims 4-13 over Eide in view of Malavieille and Daniel, and the § 103(a) rejection of claims 52-54 over Eide in view of Malavieille and Lebby.

35 U.S.C. § 103(a) REJECTION OF CLAIMS 62-70 OVER MALAVIEILLE IN VIEW OF BISCHEL

CLAIMS 62 AND 63

Appellants argue that Bischel only discloses stencilling re-radiator material, not formable waveguide material (Br. 20). Appellants contend that the re-radiator material radiates and does not guide and direct light as a waveguide (Br. 20).

We have considered all of Appellants' arguments and are unpersuaded for the reasons below.

Malavieille discloses placing index matching medium into the grooves of the block 4 and placing fibers in the grooves (Malavieille, col. 5, ll. 29-48).

Bischel discloses an optically integrated pixel microstructure that includes an optical beam path 805 and a pit 810 (Bischel, Figure 8, col. 13, ll. 46-50). Bischel further discloses that the pit may be filled with optically transparent material with properly chosen refractive indices (e.g., matched to the optical beam path 805) that permits the light to be transmitted as an optical waveguide (i.e., "waveguide" as construed by the Board above in our discussion of the § 102(b) rejection over Eide) (Bischel, col. 13, ll. 50-65; col. 14, ll. 21-27). Bischel discloses that optically transparent material (i.e., waveguide) may be stencil printed into the pit (col. 15, ll. 4-9).

From these disclosures, we agree with the Examiner that it would have been obvious to combine Bischel's stencil printing of the optically transparent material with Malavieille's method of connecting optical fibers

"to provide any [of a] variety of techniques for dispensing the waveguide material into the pit or groove" (Ans. 8).

We are unpersuaded by Appellants' argument that Bischel only discloses stencil printing re-radiator material. Rather, Bischel clearly indicates stencil printing optically transparent material (i.e., waveguide material) (Bischel, col. 15, ll. 4-9). Accordingly, Appellants' arguments directed to the function of the re-radiator material are not persuasive in view of Bischel's disclosure that optically transparent material is stencil printed into the pit to permit the light to be transmitted (Bischel, col. 13, ll. 50-65).

We add that combining Bischel's stencil printing of optically transparent material into pits with Malavieille's method of connecting optical fibers by depositing index matching medium 59 into grooves is simply the predictable use of prior art elements (depositing techniques) according to their established functions (i.e., material deposition). *KSR Int. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740 (2007).

For the above reasons, we affirm the Examiner's § 103(a) rejection of claim 63 over Malavieille in view of Bischel as well as the corresponding rejection of claim 62 which has not been separately argued and therefore falls with claim 56 (as indicated above).

DEPENDENT CLAIMS 64 AND 65

Claims 64 and 65 depend from claim 61. As indicated above with regard to claim 61, we reverse the Examiner's § 102(b) rejection of claim 61 over Malavieille. Accordingly, we reverse claims 64 and 65, by virtue of their dependency on claim 61, for the same reason the rejection of claim 61 is reversed.

Accordingly, we reverse the Examiner's § 103(a) rejection of claims 64 and 65 over Malavieille in view of Bischel.

CLAIMS 66-70

As noted earlier in the opinion, we reverse the rejection of independent claim 66 under § 102(b) over Malavieille because it fails to disclose "positioning at least one active optical component within the precision mold" and "the alignment structure providing sufficiently accurate alignment to eliminate the requirement for active alignment." Bischel does not cure Malavieille's noted deficiencies.

Accordingly, we reverse the Examiner's § 103(a) rejection over Malavieille in view of Bischel of independent claim 66 and claims 67-70 which depend there from.

DECISION

We AFFIRM the Examiner's § 102(b) rejection of claim 19 over Eide.

We AFFIRM the Examiner's § 102(b) rejection of claims 20-23, 38, 45-51, and 56-60 over Malavieille.

We REVERSE the Examiner's § 102(b) rejection of claims 61 and 66 over Malavieille.

We REVERSE the Examiner's § 103(a) rejection of claims 1, 2, 55 [*sic* 54], and 55 over Eide in view of Malavieille.

We REVERSE the Examiner's § 103(a) rejection of claims 4-13 over Eide in view of Malavieille and Daniel.

We REVERSE the Examiner's § 103(a) rejection of claims 52-54 over Eide in view of Malavieille and Lebby.

We REVERSE the Examiner's § 103(a) rejection of claims 64-70 over Malavieille in view of Bischel.

We AFFIRM the Examiner's § 103(a) rejection of claims 62-63 over Malavieille in view of Bischel.

The Examiner's decision is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

tc/ls

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